ARS 843 (2012) (English): Cassava crisps -- Specification

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Cassava crisps — Specification

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Foreword

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ARSO Central Secretariat
International House 3rd Floor
P. O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel. +254-20-224561, +254-20-311641, +254-20-311608
Fax: +254-20-218792
E-mail: arso@arso-oran.org
Web: www.arso-oran.org

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International House 3rd Floor
P.O. Box 57363 — 00200 City Square
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Tel: +254-20-224561, +254-20-311641, +254-20-311608
Fax: +254-20-218792

E-mail: arso@arso-oran.org
Web: www.arso-oran.org

Introduction

Crisps are thin slices of fruit or vegetable (usually cassava), deep-fried or baked until brittle and served as an appetizer, side dish, or snack. The crisps are just cooked and salted, but manufacturers can add a wide variety of seasonings using herbs, spices, cheese, or artificial additives.

Crisps are an important part of the snack food in the market. Crisps can be packaged in a variety of ways including tins to keep the crisps fresh until opened.

This standard is intended to provide guidance on the essential characteristics of crisps in order to promote the use cassava in the processing of crisps and ensure that products are of high quality and safety.

Cassava crisps — Specification

1 Scope

This African Standard specifies requirements and methods of sampling and test for crisps made from sweet varieties of cassava (*Manihot esculenta* Crantz*).*

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

ARS 471, *Food grade salt — Specification*

WD-ARS 835:2012, *Fresh sweet cassava — Specification*

WD-ARS 844:2012, *Cassava and cassava products — Determination of total cyanogens — Enzymatic assay method*

CODEX STAN 192, *General standard for food additives*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 712, *Cereals and cereal products — Determination of moisture content — Reference method*

ISO 2171, *Cereals, pulses and by-products — Determination of ash yield by incineration*

ISO 3960, *Animal and vegetable fats and oils – Determination of peroxide value – Iodometric (visual) endpoint determination*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 5498*, Agricultural food products — Determination of crude fibre content — General method*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella* spp.

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

ISO 27107, *Animal and vegetable fats and oils — Determination of peroxide value — Potentiometric end-point determination*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1
cassava crisps
thin slices of peeled and washed cassava roots deep-fried until crunchy

3.2
food grade material
material that is free from substances that are hazardous to human health and may be permitted to come in contact with food.

3.3
foreign matter
organic and inorganic materials (such as sand, soil, glass) other than extraneous matter in the crisps

3.4
extraneous matter
organic matter of origin other than cassava crisps

4 Essential quality and compositional requirements

4.1 Raw materials

The following materials shall be used in the processing of cassava crisps:

4.1.1 Cassava roots — Complying with WD-ARS 835:2012. They shall be mature, fresh, peeled and clean.

4.1.2 Edible oil or fat — Shall comply with the relevant African Standards.

NOTE Using the oil several times may lead to poor quality and affect the safety of the crisps.

4.2 Optional ingredients

4.2.1 Edible salt — Shall comply with ARS 471.

4.2.2 Spices and condiments — Shall comply with the relevant African Standards.

4.3 Physical requirements of the finished product

4.3.1 Physical and sensory factors

a) Plain cassava crisps shall be light yellow to golden brown in colour. Where spices or other additives are used, the colour shall be characteristic of that ingredient.

b) Cassava crisps shall be free from off-flavour, rancidity, bitter taste and any other blemish.

c) The crisps shall be uniform in size and have a thickness of between 1.0 mm - 1.5 mm.

d) The cassava crisps shall not show any blisters or noticeable separation between the outer and the inner portions.

e) The cassava crisps shall be crunchy or crispy and free from sogginess and excessive oil.

4.3.2 Defects

Cassava crisps shall not contain more than 10 % by mass of small pieces, slivers and irregular pieces.

Packaged cassava crisps shall have not more than 1 % of the crisps with the following defects:

a) surface or internal pigmentation;

b) blisters;

c) callous area; and

d) black specks and spots.

4.3.3 Foreign matter and adulterants

Cassava crisps shall be free from foreign matter and any other adulterants

4.4 Compositional requirements for cassava crisps

Cassava crisps shall conform to the chemical requirements specified in Table 1.

Table 1 — Compositional requirements for cassava crisps

Parameters	Requirements	Method of test
Moisture content, %, by mass, max.	5	ISO 712
Fat content on dry weight, %, max.	35	ISO 11085
Free fatty acids on dry weight basis, %, max.	0.5	Annex B
Sodium chloride (NaCl) on dry weight basis, %, max	2.0	Annex C
Potential cyanide, mg/kg, max	10	WD-ARS 844:2012
Acid insoluble ash, %, by mass, max	0.05	Annex A
Peroxide value, meq oxygen per gram	0.5	ISO 3960 or ISO 27107

5 Food additives

Food additives may be used in the preparation of cassava crisps in accordance with CODEX Stan 192.

6 Contaminants

6.1 Pesticide residues

Cassava crisps shall conform to maximum residue limits for pesticide residues established by the Codex Alimentarius Commission for this commodity.

6.2 Other contaminants

Cassava crisps shall comply with the maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193).

7 Hygiene

Cassava crisps shall be prepared and handled in a hygienic manner in accordance with ARS 53 and shall conform to microbiological limits specified in Table 2.

Table 2 — Microbiological limits for cassava crisps

Micro-organism(s)	Requirements	Method of test
Total viable count, CFU per gram, max	10^4	ISO 4833
Escherichia coli, CFU per 10 grams	Shall be absent	ISO 7251
Salmonella	Shall be absent	ISO 6579
Yeasts and moulds, CFU per gram	10^3	ISO 21527-2

8 Packaging

8.1 Before packaging, excess oil shall be removed and the crisps packaged within a short time after frying so as to keep the crispy taste and texture.

8.2 Cassava crisps shall be packaged in food grade material which will safeguard the hygienic, nutritional, and organoleptic qualities of the product.

8.3 The net weight of the packages for cassava crisps may be required to meet the relevant regulations of the destination country.

9 Labelling

9.1 In addition to the requirements of ARS 56, the following specific labelling requirements shall apply and shall be **legibly** and **indelibly** marked:

a) common name of the product ‘Cassava Crisps’;

b) name, and physical address of the manufacturer/ distributor and /or trade name/ brand name;

c) if spiced they shall be labelled ‘Spiced Cassava Crisps’;

d) date of manufacture;

e) list of ingredients;

f) lot identification;

g) expiry date;

h) country of origin;

i) the net weight in metric units;

j) storage instructions;

k) declaration stating “salted” or “unsalted”;

l) declaration of flavouring agent or spice used; and

m) instructions on disposal of used package.

9.2 When labelling non-retail packages, information for non-retail packages shall either be given on the packages or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the packages.

10 Methods of test

The product covered by this standard shall be tested in accordance with the methods of test indicated in the relevant clauses of this standard.

11 Criteria for conformity

A lot shall be declared as conforming to this standard if samples inspected or analysed for quality requirements conform to the provisions of this standard.

Annex A
(normative)

Determination of acid insoluble ash

A.1 Reagent

A.1.1 Dilute Hydrochloric Acid — 1:1, prepared from concentrated hydrochloric acid.

A.2 Procedure

A.2.1 Weigh accurately about 2 g of the dried material in a tared porcelain, silica or platinum dish. Ignite with a meker burner for about 1 hour. Complete the Ignition by keeping in a muffle furnace at 500 °C to 570 °C until grey ash results.

Cool and filter through whatman filter paper No. 42 or its equivalent. Wash the residue with hot water until the washings are free from chlorides as tested with silver nitrate solution and return the filter paper and residue to the dish. Keep it in an electric air oven maintained at 135 ± 2 °C for about 3 hrs. Ignite the dish again for about 30 minutes, cool and weigh. Repeat this process till the difference between two successive weighings is less than 1 mg. Note the lowest weight.

A.3 Calculation

A.3.1 Acid insoluble ash, per cent by weight

$$= \frac{100(M_2 - M)}{M_1 - M}$$

where,

M_2 = the lowest weight, in g, of the dish with the acid insoluble ash;

M = weight, in g, of the empty dish; and

M_1 = weight, in g, of the dish with the dried product taken for the test.

Annex B
(normative)

Determination of free fatty acids

B.1 Apparatus — Soxhlet fat extraction apparatus

B.2 Reagents

B.2.1 Petroleum ether, distilling below 65 °C, or ethyl ether.

B.2.2 Alcohol potassium hydroxide, 0.1 N (use absolute or alcohol denatured with methanol

B.2.3 Alcohol-ether mixture, equal volumes of 96 % alcohol and ethyl ether

B.2.4 Phenolphthalein solution, 1 % in alcohol or alcohol denatured with methanol. Add 0.3 mL per 100 mL mixture of alcohol-ether and add alcoholic KOH solution to a faint pink.

B.3 Procedure

B.3.1 Extract 10.00 g ± 0.01 g of the sample taken in a thimble with petroleum ether for about 4 h in a Soxhlet extraction apparatus. Completely evaporate the solvent from the extraction flask (weighed previously) on a steam bath, cool and weigh the extraction flask with the residue. Dissolve the residue in the extraction flask with the 50 mL of the alcohol-ether phenolphthalein solution. Titrate the dissolved extract, with standard potassium hydroxide solution, to a faint pink colour, which persists for 10 s. If emulsion is formed during titration, dispel by adding a second 50 mL portion of the alcohol-ether phenolphthalein solution.

B.3.2 Make a blank titration on 50 mL of the alcohol-ether phenolphthalein solution and substract this value from the titration value of the sample. If the additional 50 mL portion of the alcohol-ether phenolphthalein solution is added, double the blank titration.

B.4 Calculation

Calculate the acid value from the following formula:

$$\text{Acid value (as oleic acid)} = \frac{56.1VN}{M}$$

where,

V is the volume, in mL, of standard potassium hydroxide solution used;

N is the normality of standard potassium hydroxide solution; and

M is the mass, in g, of the material taken for the test.

Annex C
(normative)

Determination of the sodium chloride content

C.1 Scope

This method determines the content of chlorides.

C.2 Definition

The chloride content corresponds to the sum of all anions (halides) calculated as sodium chloride precipitable with silver ions in a nitric acid solution.

C.3 Principle

Quantitative precipitation of the halides extracted from the ash in a nitric acid solution with $AgNO_3$ in excess.

Back titration of the surplus $AgNO_3$ with ammonium thiocyanate, using ferric alum (ferric ammonium sulphate) as the indicator.

C.4 Reagents

C.4.1 Distilled or demineralized water

C.4.2 $AgNO_3$ solution, 0.1 N (16.9888 g $AgNO_3$)

C.4.3 NH_4SCN solution, 0.1 N (7.6113 g NH_4SCN). In practice a slightly higher weight is taken and the solution is adjusted by dilution against a 0.1 N $AgNO_3$ solution.

C.4.4 Cold saturated $NH_4Fe(SO_4)_2.12H_2O$ solution (approximately 40 %). The ensuing brown colouring is eliminated by adding pure nitric acid dropwise.

C.4.5 HNO_3 (approximately 30 %)

C.4.6 Diethyl ether of nitrobenzene

C.5 Apparatus

C.5.1 Measuring flask, 100 mL

C.5.2 Burette, 50 mL

C.5.3 Erlenmeyer flask, 200 mL

C.5.4 Pipettes

C.5.5 Funnel, filtering paper

C.6 Procedure

The ash (residue after carbonisation and incineration of the potato crisp at a maximum temperature of 550 °C in a muffle furnace) obtained from 1 g – 2 g dry matter is extracted by means of 80 mL – 90 mL hot distilled water acidified with a few drops of nitric acid. The washings are filtered off into a 100 mL measuring flask; after cooling distilled water is added until the mark is reached (stock solution).

In proportion to the expected chloride content aliquot part of this solution, which should preferably contain 50 mg – 100 mg NaCl, taken off, distilled water being added to obtain a quantity of approximately 100 mL.

Subsequently 5 mL ferric alum solution (see C.4.4), 20 mL 0.1 N $AgNO_3$ solution (see C.4.2) and 5 mL – 10 mL ether or 1 mL nitrobenzene are added; titration is carried out by means of an ammonium thiocyanate solution 0.1 N (see C.4.3), until the red colouring remains after stirring.

C.7 Expression of results

Report in percentage by weight to one decimal place.

$$\text{Chloride content} = \frac{5.65\ (V_2 - V_3)\ \text{x}\ V\ \text{x}\ 100}{V_1\ \text{x}\ P}$$

where,

P is the test portion, in mg, incinerated;

V is the mL of the stock solution derived from the ash;

V_1 is the volume, in mL, stock solution used from titration;

V_2 is the volume, in mL, $AgNO_3$ added;

V_3 is the volume, in mL, NH_4SCN necessary for back titration.

Bibliography

EAS 743:2010, *Cassava crisps — Specification*